

## RESULTS.

Of the 72 cases which we include in our series, 42 were treated by the medical measures described, with 32 cures; seven have been very much helped; three have been decidedly improved.

Thirty cases have been operated upon. Of these, three, operated upon for recurrent hemorrhages, all relapsed; in two cases where gastro-enterostomy was performed, death occurred from acute dilatation of the stomach; one gastro-enterostomy died of embolism, another of pneumonia. One case operated upon for chronic perforation died of acute sepsis; and another, operated upon for acute perforation, died of shock following operation. One case, where resection was performed, died of shock after operation. Another of our patients, where resection was performed by the Mayos, relapsed after six months.

We have therefore had a total of seven deaths after operation and four relapses. A large number of our operated cases are far from well, as evidenced by complaints of pain, sour stomach or occasional feelings of gastric distress.

## SURGERY OF PEPTIC ULCER.\*

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What we have learned of the physiology and pathology of digestion in the last ten or fifteen years has overturned most of our old notions without giving us a stable foundation in their place. The next few years should clarify the subject. Facts and data enough are at hand; it remains to sift and study them.

In the first place we have learned to diagnose ulcer better; it is especially the Röntgen ray that has helped us here. We have learned to distinguish between the different kinds of ulcer, especially as to anatomical location, and we have learned that different kinds of ulcer and differently located ones demand different treatment. Our views, however, as to what kind of treatment is best adapted to each particular form are anything but settled. On the whole I think that our diagnostic insight has outstripped our therapeutic ability.

As to the various kinds of ulcer: The acute ones, the so-called toxic ulcers, if uncomplicated, are not subjects for surgical intervention. They seem to do well enough under medical care, rest and diet. Of course the treatment is lengthy, but it is a mistake to think that surgery can shorten it. The condition predisposing to ulcer remains the same after operation as before—to perform a gastro-enterostomy and to dismiss the patient from medical care after his wound is healed, to say to him, "Go home, you're cured," is to invite almost certain distress and recurrence.

Surgical intervention does not shorten the time of treatment in these cases at all, it only does so when the conditions underlying the process of ulceration have already been overcome,—when we

are dealing not so much with ulceration as with its effects,—then, in the case of a stricture or a scar, we *may* relieve the patient by an operation so that he is dismissed cured as soon as his wound is healed. In acute or toxic ulcer, indeed in the great majority of all cases of ulcer, he needs as careful and as continuous supervision after his operation as before.

Simple acute ulcer should be left to the medical man to treat, with one exception *perhaps*,—and that is duodenal ulcer. Duodenal ulcer presents surgical problems different to those of stomach ulcer mainly because of the anatomical difference in the two organs. The stomach hangs free and carries a peritoneal investiture on both sides; the duodenum lies taut against the posterior belly wall. If a gastric ulcer, particularly a superficial one, heals and contracts down to a scar, it often leaves enough material in the circumference of the stomach unaffected to make up for this contraction. The duodenum is much less elastic, its walls are unyielding and its fastening to the belly wall such that when an ulcer heals and contracts it is prone to drag the adjacent tissues with it and make a stricture. It is this constricting after-effect of duodenal ulcer that might justify intervention even in acute cases.

Certain complications of acute ulcer, whether gastric or duodenal, justify, or make operation imperative. First, perforation into the free peritoneum. It is particularly the acute ulcers that are liable to this complication. The chronic ones if they perforate are more likely to be walled off and to make a localized abscess.

A very fat woman was operated at the City and County Hospital for an umbilical hernia containing large amounts of lipomatous omentum. Much of this was tied off and resected. Two weeks after operation she was suddenly seized with excruciating pain in the upper belly, collapse and vomiting. A probable acute pancreatitis was diagnosed. She died in 12 hours. Autopsy showed a perforated acute ulcer the size of a dime in the stomach wall, possibly from a retrograde thrombosis or embolism of the ligated omental vessels.

The first thing to do in a perforation is to seal the hole by means of a deep infolding suture; it is wise to reinforce this if possible by tacking a flap or a free graft of omentum or peritoneal fat over the suture line. Whether or not to add a gastro-enterostomy depends on the state of the patient and the site of the ulcer. Gastro-enterostomy is particularly indicated in perforating pyloric ulcer if the state of the patient will at all permit,—both to relieve the pressure of stomach contents driven by peristalsis against the suture-line at this point, and to forestall the future pyloric stricture which an infolding here has the tendency to produce.

Continued and copious hemorrhage is another complication demanding operation. It is often hard to know what to do in these cases. We are not to wait until the patient is exsanguine before resorting to operation. On the other hand,

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hemorrhage from an acute ulcer, where the arteries are not sclerotic often stops spontaneously;—especially in gastric ulcer. Copious hemorrhage with melena from a duodenal ulcer usually means erosion of the duodeno-pancreatic artery and will not stop unless arrested surgically.

We should be sure of the ulcer before we operate. You will allow me to insist on this matter of diagnosis. It is remarkable how often the symptom of hematemesis means anything but ulcer of the stomach. An old classical sign degraded from its pre-eminence! It is remarkable how little it is to be depended upon as a sign of ulcer and what various things it may mean—cirrhosis of the liver, uremia, appendicitis, not to speak of confusion with hemoptysis in pulmonary tuberculosis,—even in tabic crises I have seen an abundant vomiting of blood. Only a previous knowledge of the man's tabes saved me from error in this case, I am sure.

A man at the City and County Hospital suddenly began to vomit great quantities of blood. He had a history of previous attacks of dyspepsia. He was collapsed, very pale, almost exsanguine. A transfusion of blood was done and subsequent laparotomy proposed. After the transfusion the man stopped bleeding, but his pallor did not diminish nor his hemoglobin rise materially. In about three weeks he died without having been operated on. Autopsy showed shrunken kidneys, and multiple uremic petechiae of the stomach and bowels,—not a trace of an ulcer. He had shown no other signs of uremia; his urine contained a little albumen and a few casts, nothing noteworthy for a man of his age and habits.

A similar case occurred shortly after in a girl with nephritis after bichloride poisoning.

Another man, an alcoholic, had a copious vomiting of blood. His liver was somewhat enlarged. The interne diagnosed a cirrhotic hematemesis, but his symptoms and history were so characteristic of ulcer that I opened the abdomen. He had no ulcer, so I did nothing. Fortunately, he recovered. He had an alcoholic gastritis and a cirrhosis.

A man in the University of California service at the same hospital vomited large amounts of blood; a gastric ulcer was diagnosed. Gastro-enterostomy was performed. The pylorus was thickened and was thought to be the seat of ulceration. After operation the man vomited more blood than ever; the abdomen was again opened and the pylorus resected. Examination of the resected specimen showed no trace either of a fresh ulcer or of an ulcer scar. The diagnosis in this case was never made clear; the man recovered.

I might multiply cases; but this is not the surgery of peptic ulcer, and again, unfortunately, it is, too often. These things make one hesitate when brought to face a patient who is vomiting blood. Hemorrhage from the stomach is rarely so severe as to make immediate laparotomy imperative. A little time spent on diagnosis before opening the belly is rarely to the patient's disadvantage. On the whole I should say, "Don't hurry. Be sure of your diagnosis first. Then if the hemorrhage

does not cease, operate—if possible, before the patient is exsanguinate or collapsed."

A preliminary transfusion of blood will do no harm, whatever the cause of the gastric hemorrhage may be; it will give time to study the case diagnostically, and if the hemorrhage is from some other cause than an eroded artery may cause it to cease permanently.

After the abdomen is open it is often a matter of much difficulty to determine the source of bleeding. Direct inspection through an incision into the stomach is sometimes of use, more often little help. The gastric mucosa lies in folds and ridges which hide a bleeding point effectively. One can usually feel as much from the outside of the stomach as one can see through an incision. If an ulcer is found it should be occluded with a deep Draper-Mayo suture, then infolded if possible. If the ulcer is too large or too indurated this may not be feasible and we may have to excise or resect in order to stop the bleeding. This, however, is not often the case in acute ulcer, which we are considering here.

Further indication to operate may be given by intractability to medical measures, but in this case, where proper medical treatment has been tried for a proper length of time, the ulcer is no longer acute, it has become chronic.

This brings us to the actual field of the surgeon—chronic indurated ulcer. I think we are all agreed that little can be done for large chronic callous ulcers by medical means; what can be done for them surgically? That depends mainly on the location of the ulcer, and its complications. Mayo's and Moynihan's statistics are the largest. They have both followed their cases over a considerable period of years.

#### MAYO (GRAHAM) PEPTIC ULCER.

	Number...	Cured.....	Much Improved...	Fair.....	Cured and Improved...	Benefited...
Total duodenal .....	436	70%	18%	10%	88%	98%
Duodenal (obstruction)...	163	71%	23%	3%	94%	97%
Duodenal (no obstruct'n)...	275	68%	17%	12%	85%	97%
Total gastric.....	162	58%	22%	13%	80%	93%
Gastr. (obstruction).....	52	67%	25%	6%	92%	98%
Gastr (no obstruction)...	110	51%	23%	14%	74%	88%

#### MOYNIHAN.

Duodenal Ulcer—Total cases..302.	
Operative deaths .....	5—1.65%
Died later of other causes.....	6—2%
Cured .....	250—82.8%
Improved .....	21—7%
Doubtful improvement .....	1—0.32%
No better .....	3—1%
Not traced .....	16—5.3%

These operations were all done by the same man or the same group of men. The statistics of some foreign clinics may be of interest as more closely approximating current conditions. The operations were done by operators of varying ability, chiefs and assistants, which makes these statistics more generally applicable than those of Mayo and Moynihan, who are better surgeons and operators than the most of us. Petré, for instance, cites 328 cases from 14 different Swedish hospitals. He gives for 164 cases of gastro-enterostomy performed from 1904-8, a mortality of 5.5%; for re-

section and excision, 14%. Payr gives 465 cases of resection carried out by 31 different surgeons with 10% mortality. In general, I think that we may ascribe to resection carried out by the surgeon of good average ability a mortality of about 10%, and to gastro-enterostomy a mortality of not over 5%—of late years considerably less.

Late results of operation are as follows: Petré gives 243 cases, 2/3 of them followed for over 3 years, 52% were cured, 73% cured or much improved, 27% still having more or less severe symptoms. Most statistics of surgeons of good average ability give about the same results for the operative treatment of peptic ulcer, about 3/4 of the patients are cured or much benefited, the remaining 1/4 still has more or less trouble.

Now we must confess that all surgical procedures for peptic ulcer are only symptomatically therapeutic. We may, by resection or excision, remove the ulcer, by gastro-enterostomy or infolding hasten its cure, but none of these measures attack its cause, whatever that may be; the real causal therapy, the after-treatment, often lies largely in the hands of the medical man who attends the patient after the surgeon dismisses him.

It is only of late that increasing experience has caused men like Mayo and Moynihan to insist more and more on a thorough exploration of the abdomen in cases of peptic ulcer. It is in extra-gastric conditions that we must seek a surgical therapy that may prove really causal. The frequency of intra-abdominal infections, of cholecystitis and chronic appendicitis, of past typhoid (Mayo found 17% of typhoid history in his series of peptic ulcer), has struck all observers.

What have these processes to do with ulcer? Are they the source of minute infectious thromboses and emboli in the portal system, which cause the primary necrosis and secondary peptic ulceration of the gastric and duodenal mucosa? It was hard to believe this in the face of all the unsuccessful attempts at the experimental production of peptic ulcer by direct infection of the stomach. Rosenow's experiments, however, where peptic ulcer followed experimental streptococcic sepsis with great regularity and where the organisms were demonstrated in the ulcer wall, have made this infective cause of ulceration seem very plausible.

Or are these infections and spasms of the appendix, the gall-bladder, the pylorus merely an expression of a general spasmophilic tendency (whatever that may mean), of a vagus reflex, as v. Bergmann, Rössle and others would have us believe?

Or is the appendicitis, colitis, cholecystitis the primary process in another reflex sense? A number of men, among them Dr. Alvarez here, have shown us that the peristalsis of the whole digestive tube is a most delicate and sensitive mechanism; that any irritation of the lower bowel may delay peristalsis of the upper; that an irritation at the ileocecal valve may cause a closure and contraction at the outlet of the stomach. Now if we have any irritative process, gastric or extragastric, causing this spasm, it will do two things: in the first

place, it will cause a local ischemia of the contracted segment—that a spasm of the musculature of the stomach causes a blanching, we can see during the course of any laparotomy by squeezing the stomach; in the second place, the spasm causes a retention and a consequent hyperchlorhydria. Now in these two elements, ischemia and hyperchlorhydria, produced by a pure reflex irritation, have we not the necessary factors for the production of peptic ulceration?

The consideration of these three theoretical possibilities in the pathogenesis of many forms of peptic ulcer, viz.: direct infectious thrombosis, spasmophilia, and reflex irritation, has, I hope, not led me too far afield; they have a direct bearing on our surgical maneuvers; they offer possibilities of a surgical therapy truly causal. If an inflamed appendix may be the primal cause of ulceration, remove it; if an infected gall-bladder, drain it; if a colitis, treat it. Then you will have done something that will tend to cure and to prevent recurrence, more than all unilateral pyloric exclusion, gastro-duodenal implantation and other new and rare procedures of whose rationale we know little more than nothing.

It has been said sarcastically that the seat of nine-tenths of gastric ulcers is in the lower right quadrant of the belly. If not the seat of gastric ulcer, perhaps then its cause!

I have left out of consideration the great class of arterio-sclerotic ulcers to which Ophüls has called attention. In those cases where the thickening of the gastric vessels is but a part of a general sclerosis, we can of course do nothing causally. There are, however, others that show a proliferation of the intima of the gastric vessels alone, without systemic arterial disease. It is difficult here to say whether this local arterial thickening is a sequel of the ulceration, a sequel of the causal spasm or infection, or whether it is really the primal factor. Ophüls has already called attention to this point. If it is not causal, if the thickening is but a part of the consequences of the primary irritative or infectious process, then by attacking the process itself we may be able to act causally in this class of locally sclerotic ulcer also.

Now besides these true peptic ulcers with accompanying or rather underlying appendicitis or cholecystitis, we have others; cases of hyperchlorhydria, vomiting, hematemesis, typical X-ray plates and a confident diagnosis, where we open the belly and find little or nothing; nothing but a chronically inflamed appendix perhaps, and even that dubious. We doubtfully remove the appendix in the hope that chance may help the patient to get well—and he does get well! May our diagnosis not have been so far astray here after all? May not the gastric conditions causing these pre-eminent gastric symptoms have been but the precursors of future ulceration, which our appendectomy or cholecystostomy has helped to avoid? The surgeon has errors enough charged to his score; he may now and then blunder into doing some good.

A warning may not be amiss here. To do good, and to judge these cases aright, the surgeon must

enter the field with an open mind. Nothing can stand a man in better stead in this connection than a remark of Moynihan's, who said: "Never assume a peptic ulcer that you cannot demonstrate to the onlookers." The diagnosis of *surgical* peptic ulcer is not doubtful. If an ulcer is worthy of surgical measures, it can be seen and felt and demonstrated. All "peritoneal congestions" and "adhesions" and "mucous erosions" are but subterfuges and placebos for the inward doubts of an operator who, afraid to acknowledge his mistaken diagnosis, acts on preconceived notions of what he *ought* to find, and cannot. We must approach every ulcer case with an open mind. There are two diagnoses to be made of a peptic ulcer: one before the belly is opened, and the other afterward. And if the second does not demonstrate a *real* ulcer, one that can be seen and felt, then to let the first guide our operative maneuvers is to court disaster. If there is no palpable ulcer, look further; if there is an appendicitis or a cholecystitis or a colitis, treat that, and let the stomach alone. The patient will often get well; surprisingly often. If you find nothing, do not be afraid to do nothing. It is far better to close the abdomen than to do a gastro-enterostomy for a preconceived notion of what ought to be an ulcer, and is not. Of all ulcers those least benefited by gastro-enterostomy or resection, or by any gastric operation, are those that are not there. It is the gastro-enterostomies for "mucous ulcers," "superficial ulcers," for ulcers that are not ulcers, which give trouble, have vicious circle afterwards, have the largest operative mortality and the greatest post-operative distress. I do not deny that there may be ulcers that cannot be detected from the outside of the stomach, neither by touch nor sight; but if there are, they do not warrant surgical interference with the stomach, and should have remained in the medical man's hands in the first place. If the surgeon finds them he should return them to the internist without the additional complication of a gastro-enterostomy or a resected stomach.

Enough. It all leads to this: In operations for peptic ulcer or for conditions showing characteristic signs of peptic ulcer, the belly should be thoroughly reviewed for other irritative or infectious lesions in all cases, and the stomach should not be interfered with unless in the presence of a clearly demonstrable lesion.

There remains to be considered the strictly local therapy of chronic callous ulcer. The question of resection or excision vs. gastro-enterostomy does not yet seem to be definitely settled. The crux of this question is not the difference in the relief of symptoms nor freedom from recurrence afforded by these two respective procedures; for as far as I have been able to gather from statistics, there seems to be very little difference, but the danger of malignancy, present or future. Now, where there is the least doubt of an ulcer being malignant, either in the light of clinical evidence or operative findings, I think that all are agreed that it is far wiser to remove it. The question hinges upon our ability to settle this doubt. We have no clinical tests that allow us to determine accu-

rately whether an ulcer is benign or cancerous. Even with the belly open, there are many cases in which we are unable to decide.

Let me show you this specimen: Here you see two separate processes, one at the lesser curvature, one at the pylorus. A resection was done because the thickened callous mass at the lesser curvature, with almost pathognomonic miliary nodules in the serosa above it, seemed most suspicious of cancer. The sharp, punched-out pyloric ulcer with thickened edges seemed a typical peptic one. The man recovered. A number of sections of the mass at the lesser curvature showed nothing malignant; the peritoneal nodules were little fibromata. Sections of the pyloric ulcer also appeared benign. Diagnosis: Multiple peptic ulcer. The man got fat and went back to hard work. Six months later he came back with vomiting. Röntgen rays showed a closed gastro-enterostomy opening. We made further sections of the specimen, the suspicious ulcer of the lesser curvature still proved benign, but further examination of the apparently innocent pyloric ulcer showed cancer. The abdomen was reopened; it showed a general peritoneal carcinomatosis. An anterior gastro-enterostomy was done. The man died a month later of carcinomatosis. Here we have a typically suspicious ulcer, even with peritoneal nodules; it proves benign; and a typically innocent ulcer, punched-out and round, it proves malignant. We *cannot* tell; it is better to be on the safe side and resect in these cases.

I think, however, that it is going too far to urge resection for all cases of ulcer. The ultimate results of resection are very little better than those of gastro-enterostomy. Kocher does a gastro-enterostomy in all unsuspecting cases; he has as good results as any one—78.5% complete cures, 94% satisfactory results. Brenner, with a large material of *extra-pyloric* ulcers, has gone back from resection to gastro-enterostomy; he finds his results after resection no better than after the simpler procedure. The indication, therefore, in primarily unsuspecting ulcers lies in the risk of secondary malignant degeneration. We have heard a great deal on one side of this question—the tracing back of cancer to ulcer; very little on the other—the following of ulcer to cancer. These two aspects do not coincide.

It has been estimated that from 13 to 70% of gastric cancer originates in ulcer. MacCarthy gives 70% for the Mayo material, other surgeons from 13 to 43%, the pathologists 16 to 58%. Of patients treated for ulcer by gastro-enterostomy, however, only 1.8 to 6% develop cancer! How can we make these figures coincide? The reason seems to be that the resected specimens which form the basis for the estimate of the cancerous origin of cancer *were* resected because they *were* suspicious of cancer; and the suspicions frequently proved well founded, as in the case cited above. That would make these figures high. On the other hand, in patients with unsuspecting lesions, a gastro-enterostomy was done and the ulcer not removed. There again the innocence of the lesions was corroborated by the subsequent course. Few of these patients develop cancer. It is all a mat-

ter of diagnosis. If you have the least doubt, either from clinical, laboratory or operative findings, resect if possible; if there is really no doubt, gastro-enterostomy offers as good prospects of cure as a resection.

How does gastro-enterostomy aid towards cure? How does it work? By diverting the food-stream from the pylorus, keeping the stomach empty and setting it at rest. So we were told. But it doesn't! It seems to do none of these things. The Röntgen ray has only just begun to make us realize how little we know about it. In the first place, the gastro-enterostomy does not divert the food-stream from the pylorus, still less does it keep the stomach empty.

Cannon and others working with animals showed that the gastro-enterostomy apparently does not work at all, that all the food goes through the pylorus and none through the gastro-enterostomy. That is true for cats and dogs, but not for man; in most cases food leaves both by the pylorus and by the gastro-enterostomy. It does not *drain* through the gastro-enterostomy. Even when we make it large and at the "deepest point," as we were told, the food does not run out of the stomach as out of a hole in the bottom of a bucket; it passes out rhythmically and peristaltically. The gastro-enterostomy does not keep the stomach empty. Radiographs show the emptying to be somewhat accelerated in most cases, from one-half to two to four hours; the stomach, however, is not kept empty by any means, nor is it kept at rest. Emptying through the gastro-enterostomy usually takes place with a distinct peristaltic movement.

Now if the gastro-enterostomy does none of the things it is supposed to do, what does it do? In the first place, it *does* divert the food-stream at times, viz.: when the pylorus is closed, where there is a pylorospasm, when there is an active process keeping up the pylorospasm, and just then when this diversion of the food-stream is most needed. Secondly, it does keep the stomach partly empty, keep it from being over-dilated by retained secretion and food in the presence of pylorospasm, a retention otherwise only relieved by vomiting. And thirdly, it provides a reflux of bile and of alkaline duodenal juice into the stomach. The importance of this reflux, which seems to occur in the majority of cases, I do not know. It seems to play a preponderant part in the reduction of acidity usually found after gastro-enterostomy, and this reduction again seems to be more marked in those cases examined soon after operation than in those examined later. Stomachs examined early after gastro-enterostomy contained more bile than those examined later, whose ulcers had healed. Kocher goes so far as to find a compensatory and regulatory mechanism in this reflux, the quantity of regurgitated bile being proportional to the acidity and not the reverse, as one might suppose.

We have it in our power to make a gastro-enterostomy divert the food-stream from the pylorus, should this really prove requisite to a cure. We can close the pylorus; to keep it closed, however, is not easy. The usual methods of infolding

and puckering, of longitudinal pyloroplasty, etc., have been shown by the X-ray to be ineffectual. The method of Bogoljuboff-Wilms, who occlude the pylorus with a fascial graft, and that of Lambotte, who ties it off with twine, are better, although even they are not secure. The one way to keep the pylorus shut is to cut it through and sew it up, the unilateral occlusion of v. Eiselsberg. This operation carries with it a definite risk of some per cent. Whether the results of pyloric occlusion in peptic ulcer are better than those of simple gastro-enterostomy without occlusion, is hard to say. Statistics seem to show that they are, a little; and that some simple method of exclusion, ligature with twine or fascia or infolding, should be practised in addition to gastro-enterostomy for duodenal ulcer. Moynihan's results have improved from 79 to 88% of cures since infolding these ulcers. We cannot say, however, that this improvement is due to actual pyloric closure. The infolding or puckering of the ulcer itself is probably the more important part of the procedure, whose effect on the pylorus is more imaginary than real.

There remains to discuss the value of the various operative procedures for differently situated ulcers. Those of the antrum, pylorus and adjacent duodenum may be considered together. It is these which are most benefited by gastro-enterostomy, with or without pyloric closure. Especially the stricturing ulcer scars; they give the conditions where relief after gastro-enterostomy is almost certain.

Ulcers of the body of the stomach and of the lesser curvature without obstruction are notoriously less amenable to treatment, whether surgical or medical. Of these not more than 50 to 60% are cured by surgical treatment, and not more than 70 to 80% much improved. Of course this is something. Internal medication is not very effective as regards permanency of cure in these ulcers either. I think you will even concede that it cannot permanently improve some 70 to 80% of these patients. As long as we thought that the efficiency of gastro-enterostomy depended solely on drainage of the stomach and that food passes through the gastro-enterostomy solely in the presence of pyloric obstruction, it was difficult to see the indication for gastro-enterostomy in non-obstructing ulcers of this class. Still gastro-enterostomy was done and a number of these ulcers were permanently cured or benefited. The newer studies of gastro-enterostomy have not served to shed much light on this question, but they have served to make us less positive about our indications. The results of resection seem to be little if any better than those of gastro-enterostomy. It is certain that neither resection nor excision offer security from recurrence. Brenner, mentioned above, returned to gastro-enterostomy after trying resection in a series of 67 cases of extra-pyloric ulcer. Kocher does a simple gastro-enterostomy and speaks of satisfactory results. Körte the same. However, Mayo, Moynihan and others advise resection for this class of ulcer. One fact seems established: that the results of resection or ex-

cision alone, without gastro-enterostomy, are considerably inferior to those of either the combined gastro-enterostomy and resection, or the gastro-enterostomy alone. This would make one inclined to see in the gastro-enterostomy the more important component of the operation, and to see in the resection an added risk without adequate promise of cure. Excision should certainly be combined with gastro-enterostomy. Excision alone carries with it a real danger of subsequent hour-glass contraction; the defect in the stomach always appears surprisingly large, and even when sewn up transversely is prone to contract. So in a case of Dr. H. P. Hill's. A woman had an ulcer excised. A year afterwards she began vomiting again. Re-operation showed an hour-glass stomach. Gastro-enterostomy and a gastro-gastrostomy were done. The woman has remained well since, a period of over four years.

I do not think that variation of our present gastric operative procedure has much to offer towards bettering our results in ulcer of the body of the stomach. It is to a more careful abdominal exploration that we should look, more attention to extragastric processes, and above all, to more solicitous post-operative care. It is just in these cases, where our results are sorry enough, that we must look to the medical man for aid; the operation may help towards a cure, it certainly does not accomplish it. We know that these cases are likely to recur; how can we expect permanent benefit if we discharge these patients as cured directly they leave the hospital, let them go home free of all dietary restriction and medical attention, turn them out to diets of pork and beans and enchiladas! If we will take enough interest in them to watch them, to send them back to their medical advisers, and to instil into their minds the necessity of at least six months' cautious living—if we will speak to them of these things *before* operating on them, and not undertake operation unless they are willing to comply, I have hopes that our surgery may prove less futile.

To conclude:

1. Acute ulcer is not to be treated surgically unless: (a) perforated; (b) bleeding obstinately, or (c) intractable by medical means.
2. Hematemesis should not be made an indication for operation unless the presence of a bleeding ulcer can be made reasonably sure. A preliminary transfusion of blood will often give time for diagnostic examination and benefit the patient meanwhile.
3. Chronic callous ulcers suspicious of malignancy should be treated by resection and gastro-enterostomy.
4. Chronic ulcers of evident innocence should be treated by gastro-enterostomy with or without pyloric closure. The results of resection are not sufficiently better than those of gastro-enterostomy to compensate for the added risk.
5. Gastric procedures should not be carried out unless indicated by clearly demonstrable gastric lesions.
6. At all operations for peptic ulcer, the ab-

domen should be carefully examined for extra-gastric irritative or infectious processes. The treatment of these may be more important causally than the treatment of the ulcer itself.

7. Our gastric operations are not causally but symptomatically therapeutic. Prolonged post-operative medical care is imperative.

In preparing this paper I have put others to a great deal of trouble in the endeavor to gather statistics that might be of local interest. I am sorry to say that the trouble was in vain. I could not gather records sufficiently explicit to make their tabulation profitable. I have to thank Drs. Stillman, Rixford, Cheney, Hill, Cooper, Schmoll, Barbat, Boardman and others for their kind help.

#### Discussion.

Dr. W. F. Cheney: I have nothing to add to what has been said to-night, but some of the points I would like to emphasize. First, it seems to me, and I think it has been brought out here to-night, that we have absolutely no method of certain diagnosis of either gastric or duodenal ulcer. Our methods are what we call inferential. With regard to a history of hyperchlorhydria, evidences of pyloric obstruction, blood in the feces, and the X-ray findings showing six-hour stasis, none of these makes us certain that ulcer exists. We obtain, by each one of these methods, facts that lead us to infer that an ulcer exists, and the more of these facts we get together, the more certain our inference becomes; but all of you must certainly have had the experience of being proven wrong at the operating table, even when inference seemed most secure.

As regards treatment, the choice between medical and surgical treatment must depend upon chronicity. All are able to cure, apparently, the acute ulcers, but the longer a man practices—the more years of experience he has—the more skeptical he becomes about medical cure of chronic gastric ulcer. He can treat the patient and relieve him for a time. But the cases I cured five or seven years ago have since been coming back with symptoms; and that is not a cure. I think the only honest position to take is to say to the patient: "I can relieve you of your symptoms, can promise you an interval of anywhere from one to five years' relief, but cannot promise you a cure."

After what we have seen at the operating table, it is unreasonable to suppose that we can, by medical means, cure chronic gastric ulcer. Contrary to what has been said by Dr. Bine, my own experience with surgical treatment has been very satisfactory, and I never hesitate to advise a gastro-enterostomy or an excision of the ulcer, when indicated. The results certainly have been more permanent than they have by any method of medical treatment, and the immediate results are likewise good. I have, fortunately, not seen any patient die from the operation, though statistics show that in a hundred cases, two or three are going to die. I think, again, that good or bad results from the operative cases depend very largely upon the surgeon who is selected to perform the operation, and I may say this because, not doing any operations, I am exempt from suspicion as to my motive. The one who is selected to do the work is the one who usually decides whether the result is going to be good or bad. A correct diagnosis and a skillful surgeon thus become the two elements in the cure of chronic gastric ulcer.

P. K. Brown: Dr. Eloesser called attention to one thing, and Dr. Schmoll and Dr. Bine to another that I want to speak about. First, the statement that after any operative procedure the patient wants to be advised that he has six months

ahead of him during which he must treat his stomach with particular care. He has got to know that he has a new mechanical problem and must constantly help it out. We try to teach such operated cases in the Southern Pacific Hospital that, unless they are prepared to do with their mouths the work that they ordinarily leave for their stomachs, they cannot expect much relief. You all know that among railroad employees hasty eating leads to all sorts of gastric disorders, and among brakemen, conductors, etc., gastric and duodenal ulcer are common. They are all put on the Lenhartz diet and advised of the danger of relapse unless they learn to eat slowly, masticating thoroughly. Operation is advised at once in event of relapse. I have seen as many as three operations done in one day for this condition, the total number including a good many pylorotomies, and in all my eight years in that hospital I have never known of but one death.

The second point is the reference to the Lenhartz diet. Our experience teaches us that this treatment has been the largest contribution to the medical care of ulcer that has been made thus far. We have practically no trouble in relieving all symptoms, modifying it slightly to suit each case. We depart from Lenhartz's plan of feeding meat on the fourth or fifth day and do not give it until daily examination of the stools shows that the bleeding has ceased. We have seen no reason, on account of the increased acidity, to stop the meat as suggested by Dr. Schmoll.

I could add a good many personal experiences of interest. One of them concerns lavage for hemorrhage. I recall one instance where as much as one quart of decomposed blood was washed out of the stomach of a patient who was slowly dying of hemorrhage. It was quite evident after having emptied the stomach of these clots, the bleeding was still going on. We put in 8 ounces of adrenalin solution, 2 ounces of 1:1000 and 6 ounces of water, having failed to stop his hemorrhage with ice water. There was some absorption, but the solution was washed out in a few minutes, and the hemorrhage had ceased, and the patient got well. It was a desperate measure, but it seemed justified.

The use of orthoform to distinguish between pains of ulcer and other suggestive pains in that location is interesting. We have tried it and are satisfied that orthoform, given shortly after a small amount of some fluid—preferably orange juice, which is very apt to cause pain—will generally relieve the pain immediately. Twenty grains is the amount usually given, the test being made on an empty stomach in the morning.

We have had operations done on cases of chronic appendicitis, having diagnosed ulcer a number of times, only to close the abdominal wound, not feeling that we ought to do a gastro-enterostomy, and proceeding to remove the appendix.

One typical case of appendix disease simulating ulcer, Dr. Levison reported at one of these meetings. It was a German girl who had been under the care of both Boas and Ewald. Each made the diagnosis of gastric ulcer in which we concurred. While on the Lenhartz diet for ulcer, she had a typical attack of appendicitis. When she was opened and the appendix removed, the presence of old adhesions indicated she had had appendicitis before, and doubtless all her symptoms, constant bloody vomiting and pain immediately after eating, were due entirely to the appendix trouble.

I don't think anyone has heard these papers without appreciating that they represent a tremendous amount of accumulated truth and the value of personal experience. Dr. Eloesser's paper especially was certainly a classic, and I shall have occasion to refer to it a good many times.

Dr. Alfred Newman: Apropos of the treatment of hemorrhage, I can mention a case I treated which may be of some interest. Twenty-four

hours after a gastro-enterostomy for an ulcer of the lesser curvature, the patient began to vomit blood. It seemed as though he had vomited a bucket of blood by the time I got there, and he was in extremis. It was a question of doing something and doing it quickly. My old standby has always been Monsel's solution. I washed out his stomach with ice water and Monsel's solution. I used two ounces in 500 cc.—two ounces in a pint. It stopped his bleeding. After I got the blood out of his stomach, I put two ounces of 50 per cent. solution into the stomach, and in order to give the heart something to go on, I gave him a liter of Dr. Hogan's gelatin solution intravenously. The patient got over his hemorrhage.

Dr. W. C. Alvarez: We must always keep in mind that the X-ray examination seldom gives us more than a functional diagnosis. Except in the few cases where we get a "Füllungsdefekt," or a perforating ulcer with bismuth outside the stomach, we do not see the lesion—we see disturbances of function from which we surmise the presence and character of the lesion.

The main question we must ask ourselves about a stomach case is, can he be treated medically with any prospect of success, or is there an organic lesion present which must sooner or later be operated upon? When we are in doubt, to which side should we lean? As Dr. Bine and Dr. Schmoll say, finances enter the problem very largely. If a man who barely exists on a small salary, be put to bed for two or three weeks—and any ulcer cure without rest in bed is a half-hearted procedure—and if at the end of that time he is no better, or if the ulcer is to break out again in a few months, you have injured him—he has wasted time and money that might have been spent on the operation.

A great deal depends on the age not only of the patient but of the illness. If a man with duodenal ulcer has had attack after attack for many years, the chances are that he has so many adhesions to gall-bladder and colon that the healing of the ulcer alone will not give sufficient relief. To be sure, surgery also must often fail to give perfect comfort afterwards. The patient cannot expect that, but he does want life to be worth living and he wants to be able to keep at work. In one of my cases recently, the surgeon found a duodenal ulcer which had become adherent to the gall-bladder, while the omentum was attached to operative scars on the pelvic organs. This condition explained the pain which she had suffered on standing, for then everything hung from the under surface of her liver. The history had been largely that of gall-stones. She is grateful for the great change in her health, although with an abnormal opening out of her stomach and some remaining adhesions she cannot hope to have the abdomen she had before.

Jordan has called attention to the fact that the usual spasmodic, hour-glass contraction relaxes and disappears at operation because of the anesthetic. In several such cases, a gastro-enterostomy opening has been placed within the zone of contraction, and the patient has died afterwards with the so-called "Duodenal death." This was due probably to the obstruction of the stoma and of the lumen of the jejunum when the spasm returned.

A good history is essential in stomach work, but unfortunately we often cannot obtain it until after operation. Before operation the patient is on his guard; he will not tell you anything which will prejudice you in favor of the knife. If you want to get a good history, take it again when he is convalescing. With great difficulty recently did I make a man admit that he had had stomach trouble at the age of twenty-two, but even this clinched my diagnosis of duodenal ulcer at forty-five. After operation he admitted that he had been close to death with appendicitis several times.

With all modern methods I defy anyone to



make a diagnosis at times between ulcer and cholecystitis. I believe that in these cases we should say as do the Mayos very frequently: "You have a surgical condition in the upper right quadrant of your abdomen, and you will have to be satisfied with that diagnosis." I have seen recently four cases, one right after the other, in which adhesions were found between duodenum and colon or duodenum and gall-bladder without any signs of previous ulceration.

Dr. G. E. Ebricht: I shall confine myself to one point: the treatment of hemorrhage. In cases of hemorrhage the mortality in cases left alone is in the neighborhood of two per cent. It requires rare judgment and rare courage, in considering a patient who has severe bleeding from stomach ulcer, to realize that if let alone his chances are better than when interference takes place. As the blood is lost, the blood pressure is lowered to such a point that clotting may take place, and the bleeding gradually stops. For that reason we avoid using cardiac stimulants in shock just as much as possible. The use of adrenalin and drugs of that nature is much best left alone if possible. If styptics can be applied locally to the bleeding point, it is a different thing, but agencies to raise the blood pressure and stimulate the patient out of shock, should be used with extreme caution.

Dr. L. Eloesser, closing discussion: We have been fortunate with our results at the City and County Hospital, more fortunate than Dr. Schmoll would indicate. We have had about a dozen cases, treated by gastro-enterostomy, resection and excision, and have been lucky enough to have had them all recover. I think it has been due in great measure to Dr. Hill's help. We have tried to work with the physician, rather than against him, and have consulted and respected his opinion as to indications for operation.

If we cannot cure causes of ulceration, medical men cannot cure them either. Perhaps we can, however, do more to cure the causes of ulceration than medical men by treating, when we open the belly, concomitant conditions, by removing the appendix or the gall-bladder.

I must strongly protest against Dr. Bine's dictum that the hour-glass stomach is not a subject for surgical intervention. I should like to ask what he means by an hour-glass stomach. Dr. Alvarez says that the hour-glass stomach disappears at operation—that it disappears under an anesthetic. Now, a true hour-glass stomach does not disappear under the anesthetic at all. Those cases that disappear are not hour-glass stomachs; they are spastic stomachs, X-ray stomachs, if you like. You can diagnose them. If the X-ray shows an apparent hour-glass, give the man a physiological dose of atropin and X-ray him again. If the spasm is gone, he has no hour-glass stomach. If you operate for hour-glass stomach and he really has one, it will not disappear under ether. You will see a scar and a constriction so firm, inelastic and tight at times that you cannot get a finger into the opening.

As to bleeding, I think, too, that bleeding in acute ulcer is not a case for surgical intervention. In aged individuals, however, when the arteries are hardened, it does not stop unless you close the vessel surgically. In acute ulcers, bleeding stops because the vessel is not sclerotic and can close by itself. These cases are for medical treatment.

I have not gone into the various surgical procedures, because I thought that their discussion was more for a surgical than a medical meeting. I think the Finney operation is valuable in many cases of pylorospasm; it does away with the dangers of vicious circle. The use of the Finney in duodenal ulcer, I think is not as good as gastro-enterostomy—we get too close to the ulcer itself, for one thing, and we do not get the reflux of alkaline intestinal contents into the stomach for another.

## THE DOSE OF SALVARSAN.

By DOUGLASS W. MONTGOMERY, M. D., San Francisco.

Because of the occasional occurrence of encephalitis hemorrhagica and other accidents, the dose of salvarsan is undergoing decided modifications. The dose recommended for general use when the drug was first introduced was 0.60 grm. for males and 0.40 grm. for females, equivalent in neosalvarsan to 0.90 grm. for males and 0.60 grm. for females. When these doses are carefully given, in almost every instance they are borne without any disagreeable symptoms whatever. There may be some vomiting, there may be some diarrhea, there may be some diuresis, but the patients usually arise from the couch, on which they have received their infusion, and experience no ill effects. Deaths do, however, result from the administration of salvarsan, and they are particularly distressful. When such an accident occurs quickly following the infusion of a drug into the blood, the physician cannot escape the feeling of responsibility, nor can he elude the censure of those that surround him. Both remorse and blame are especially sharp in those instances in which the medical man has strongly urged the acceptance of the treatment. As the whole dose is administered intravenously and at one time, it is therefore irretrievable, and when once given it goes on its way for good or for evil without any essential modification of its action being possible.

Barring accidents from faulty technique or from disability on the part of the patient, such as a persistent status thymo-lymphaticus, advanced disease of the liver of the kidneys or illy compensated valvular disease with cardiac myodegeneration, the accidents from salvarsan are very few indeed. Deaths, however, have occurred when the dose was moderate, when there was every reason to suppose the drug was unchanged, and when the technique was faultless, and when the patient seemed in every respect suited to receive the treatment. It would seem that in these rare cases the patients are abnormally susceptible to the drug. This hypersensitiveness to salvarsan may involve the skin, the gastro-intestinal tract, the kidneys, the liver or the brain and its meninges. This last class of cases in which the brain and its meninges are hypersensitive to salvarsan, constitutes by far the most interesting group.

Meirowsky and Kretzmer have tabulated the deaths from salvarsan, and these tabulations are most impressive in their bearing on the dosage, and on the question of encephalitis hemorrhagica.<sup>1</sup> In all there are only one hundred and nine deaths. As far over a million doses had been given when these tabulations were made, and as a multitude of causes, besides the nature of the drug itself, entered into the result, the small number of fatalities is remarkable. And this small number cannot be ascribed to inadvertence in reporting cases, as no drug has been watched half so jealously as salvarsan.

In eighty-five cases the stage of syphilis at which the death occurred is noted. It appears that in twelve of them the dose was given and the death